PUTNAM COUNTY ROUNDABOUTS - SUMMARY OF ANALYSIS

Intersection	Condition	Current Traffic Control	Intersection Crash Rate (Crash/MEV)	Statewide Avg. Rate for Similar	Crash Rate Ratio to State Avg.	Worst Approach LOS (v/c)	Overall Intersection LOS (Delay per Vehicle)		Vehicle Hours of Delay (VHD)			Annual VHD Reduction	Improvement Cost	User Time Cost 20 yr. Benefit/ Cost Ratio*
							AM Peak Hour	PM Peak Hour	Daily AM Peak	Daily PM Peak	Annual Total			
Ludingtonville Road and Route 52	Existing	TWSC	1.27	0.17	7.47	**F (1.66)**	F (78.6)	E (41.5)	25.24	13.90	10,176	---	---	
	Build 2	Signal				D (0.85)	C (25.4)	B (18.3)	8.16	6.13	3,715	6,461	$250,000	17.36
	Build 3	Roundabout				C (0.76)	C (15.0)	B (11.2)	4.82	3.75	2,228	7,948	$1,560,000	3.42
Hill Street and Route 6N	Existing	TWSC	0.72	0.17	4.24	**F (1.05)**	A (9.9)	B (13.5)	2.99	5.75	2,272	---	---	
	Build 1	Signal				C (0.75)	A (8.0)	A (7.4)	2.42	3.15	1,448	824	$250,000	2.21
	Build 2	Roundabout				B (0.61)	A (7.9)	B (10.2)	2.39	4.34	1,750	523	$1,925,000	0.18
John Simpson Road and Fair Street	Existing	Signal	0.62	0.42	1.48	**B (0.71)**	A (8.2)	B (10.6)	2.71	3.99	1,742	---	---	
	Build 1	Roundabout				C (0.81)	A (9.8)	C (15.9)	3.24	5.98	2,397	(655)	$1,600,000	(0.28)
Route 22 and Havilland Hollow Rd	Existing	Signal	1.34	0.68	1.97	**D (0.98)**	C (20.8)	C (27.6)	9.86	14.24	6,266	---	---	
	Build 1	Lane Add				B (0.85)	B (13.7)	B (12.5)	6.50	6.45	3,367	2,899	$36,500	53.36
	Build 2	Roundabout				C (0.78)	B (12.6)	A (8.4)	5.97	4.33	2,678	3,588	$2,185,000	1.10
Croton Falls Road and Route 6	Existing	Signal	0.77	0.68	1.13	**C (0.82)**	B (15.4)	B (16.2)	7.59	9.78	4,516	---	---	
	Build 1	Roundabout				C (0.84)	C (15.5)	C (21.1)	7.64	12.74	5,299	(783)	$2,025,000	(0.26)
Crane Road and Route 6	Existing	TWSC	0.25	0.35	0.71	**F (0.82)**	A (9.2)	A (9.2)	3.14	3.82	1,810	---	---	
	Build 1	Signal				B (0.74)	A (8.9)	A (7.6)	3.04	3.16	1,612	198	$250,000	0.53
	Build 2	Roundabout				B (0.59)	A (9.7)	A (9.2)	3.31	3.82	1,854	(44)	$1,595,000	(0.02)
Doansburg Road and Fairfield Drive	Existing	TWSC	0.88	0.35	2.51	**E (0.52)**	A (8.4)	A (9.3)	1.92	2.37	1,115	---	---	
	Build 1	Signal				B (0.79)	B (13.9)	B (14.1)	3.17	3.59	1,758	(642)	$250,000	(1.73)
	Build 2	Roundabout				A (0.51)	A (7.6)	A (6.4)	1.74	1.63	876	239	$1,720,000	0.09
Mill St/Church Rd and Peekskill Hollow Rd	Existing	Signal	1.33	0.68	1.96	**C (0.62)**	C (26.4)	C (25.2)	4.40	4.72	2,371	---	---	
	Build 2	Roundabout w/split Int.				C (0.29)	B (10.5)	A (7.0)	1.75	1.31	796	1,576	$2,830,000	0.37

TWSC = Two-way stop controlled intersection.

As significant delay issues are unlikely outside the commuter peak hours. The total daily delay reduction of an improvement is assumed to be equal to the overall delay reduction in the AM peak hour combined with the overall delay reduction in the PM peak hour.

* Roadway User costs are assumed to be $25 per VHD in 2019 using a simplified method of estimation based on average personal and truck travel time costs shown in "Work Zone User Costs - Concepts and Applications", published by FHWA, December 2011, inflation to user costs assumed to be 3% per year. Life of Improvement assumed to be 20 years.

PUTNAM COUNTY ROUNDABOUTS - SUMMARY OF SUPPLEMENTAL ANALYSIS

Intersection	Condition	Current Traffic Control	Intersection Crash Rate (Crash/MEV)	Statewide Avg. Rate for Similar	Crash Rate Ratio to State Avg.	Worst Approach LOS (v/c)	Overall Intersection LOS (Delay per Vehicle)		Vehicle Hours of Delay (VHD)			Annual VHD Reduction	Improvement Cost	User Time Cost 20 yr. Benefit/ Cost Ratio*
									Daily		Annual			
							AM Peak Hour	PM Peak Hour	AM Peak	PM Peak	Total			
Towners Rd and Hill & Dale Rd/Lakeshore Dr	Existing	TWSC	1.82	0.35	5.20	**B (0.38)**	A (6.0)	A (7.7)	0.58	1.15	450	---	---	
	Build 1A	Parking Reconfig.				B (0.38)	A (6.0)	A (7.7)	0.58	1.15	450	0	$800,000	0.00
	Build 1B	Road Realign				B (0.38)	A (6.0)	A (7.7)	0.58	1.15	450	0	$1,580,000	0.00
	Build 2	Roundabout				A (0.20)	A (4.4)	A (5.0)	0.42	0.75	304	146	$3,000,000	0.03
Fairfield Dr and Haviland Dr	Existing	AWSC	0.77	0.17	4.53	**D (0.86)**	B (11.5)	C (22.4)	2.42	5.84	2,148	---	---	
	Build 1A	AWSC w/ EB LT Lane				B (0.53)	B (11.0)	B (12.1)	2.32	3.15	1,422	725	$330,000	1.48
	Build 1B	TWSC w/ Realign+LT				B (0.43)	A (6.4)	A (4.5)	1.35	1.17	655	1,492	$1,280,000	0.78
	Build 2	Roundabout				A (0.49)	A (5.8)	A (6.8)	1.22	1.77	777	1,370	$2,500,000	0.37
Secor Rd and Wood St	Existing	AWSC	0.63	0.35	1.80	**D (0.83)**	C (18.7)	C (21.3)	5.33	6.83	3,162	---	---	
	Build 1	Signal				B (0.71)	B (10.4)	A (9.8)	2.97	3.14	1,589	1,573	$250,000	4.23
	Build 2	Roundabout				A (0.53)	A (6.1)	A (7.8)	1.74	2.50	1,102	2,059	$1,670,000	0.83

AWSC = All-way stop controlled intersection
TWSC = Two-way stop controlled intersection.

As significant delay issues are unlikely outside the commuter peak hours. The total daily delay reduction of an improvement is assumed to be equal to the overall delay reduction in the AM peak hour combined with the overall delay reduction in the PM peak hour.

* Roadway User costs are assumed to be $25 per VHD in 2019 using a simplified method of estimation based on average personal and truck travel time costs shown in "Work Zone User Costs - Concepts and Applications", published by FHWA, December 2011, inflation to user costs assumed to be 3% per year. Life of Improvement assumed to be 20 years.

PUTNAM COUNTY ROUNDABOUT FEASIBILITY STUDY
RECOMMENDATIONS SUMMARY

Int. #	Book Tab	Intersection	Signal Warrants	Crash Rate	Worst Case Capacity	Improvement Priority	Recommended Improvement (Est. Cost)	Roundabout Feasibility (Est. Cost)
1	A	Ludingtonville Road and Route 52	Satisfied 1,2,3	7.5x state avg.	LOS F v/c > 1.0 (over cap.)	HIGH	Install Traffic Signal ($250,000) Roundabout is Reasonable Option ($1.56M)	Roundabout is Feasible, but will impact wetlands/NYC watershed. Possible permit issues ($1.56M)
2	B	Hill Street and Route 6N	Satisfied 1,2	4.2x state avg.	LOS F v/c > 1.0 (over cap.)	HIGH	Install Traffic Signal ($250,000)	Roundabout Not Feasible. ROW needs, cut into significant hill. parking lot and wetland impacts.
3	C	John Simpson Road and Fair Street	Satisfied 2,3	1.5x state avg.	LOS C v/c ≤ 0.71 (no issues)	NONE	NONE. Existing signal works effectively and no safety or capacity issues noted.	Roundabout is Feasible if right of way (ROW) is purchased ($1.6M)
4	D	Route 22 and Havilland Hollow Rd	Satisfied 1,2,3	2x state avg.	LOS D v/c ≤ 0.98 (marginal)	MEDIUM	Restriping to add NB RT lane to existing traffic signal ($36,500)	Roundabout is Feasible if ROW is purchased & Parking Lots Reconfig. ($2.185M)
5	E	Croton Falls Road and Route 6	Satisfied 1,2,3	Slightly High	LOS C v/c ≤ 0.82 (no issues)	NONE	NONE. Existing signal works effectively and no safety or capacity issues noted.	Roundabout is Feasible if ROW is purchased, but would yield worse LOS than signal ($2.025M)
6	F	Crane Road and Route 6	Satisfied 1,2	Below state avg.	LOS F v/c ≤ 0.82 (marginal)	LOW	Install Traffic Signal ($250,000) Roundabout acceptable but Daily VHD Increase	Roundabout is Feasible, but will impact wetlands/NYC watershed. Possible permit issues ($1.595M)
7	G	Doansburg Road and Fairfield Drive	Satisfied 2	2.5x state avg.	LOS E v/c ≤ 0.52 (no issues)	MEDIUM	Install Traffic Signal ($250,000) to improve sight distance issues	Roundabout Not Feasible. ROW needs, significant grade issues. parking lot and driveway impacts.
8	H	Mill St/Church Rd and Peekskill Hollow Rd	Not Satisfied	2x state avg.	LOS C v/c ≤ 0.62 (no issues)	NONE	NONE. Existing signal works effectively. Sight distance issues prevents removal.	Roundabout Not Feasible. ROW needs, significant grade issues. parking lot and driveway impacts.
9	11	Towners Rd and Hill & Dale Rd/Lakeshore Dr	Not Satisfied	5.2x state avg.	LOS B v/c ≤ 0.38 (no issues)	MEDIUM	Reconfigure parking to remove backing into road ($0.8M) w/realign (1.58M)	Roundabout Not Feasible. ROW needs, significant grade issues. parking lot and business impacts.
10	12	Fairfield Dr and Haviland Dr	Not Satisfied	4.5x state avg.	LOS D v/c ≤ 0.86 (no issues)	MEDIUM	Reconstruct to add EB LT Lane ($330,000) w/Inter. Realign ($1.28M)	Roundabout Not Feasible. ROW needs, significant grade issues. parking lot and business impacts.
11	13	Secor Rd and Wood St	Not Satisfied	1.8x state avg.	LOS D v/c ≤ 0.83 (no issues)	LOW	Construct Roundabout to address right angle accidents ($1.67M)	Roundabout Feasible and can be constructed within the existing ROW. ($1.67M)

± 2.5M

CONSIDER ALL WAY STOPS